

1. *Mastacembelus* (con.).21. *flavomarginatus*, Blgr. 1898.

Cameroon, Gaboon, Ogowe.

22. *nigromarginatus*, Blgr. 1898.

Ashantee.

23. *ophidium*, Gthr. 1893.

L. Tanganyika.

## Subord. IX. PLECTOGNATHI.

## Fam. TETRODONTIDÆ.

1. *Tetrodon*, L. 1766.1. *fahaka*, Hasselq. 1757.

Nile, L. Chad, Senegal, Niger.

2. *mbu*, Blgr. 1899.

Congo.

3. *pustulatus*, Murr. 1857.

Old Calabar, Gaboon.

4. *miurus*, Blgr. 1902.

Congo.

VII.—*A Revision of the Fishes of the American Cichlid Genus Cichlosoma and of the Allied Genera.* By C. TATE REGAN, B.A.

I GRATEFULLY acknowledge the kind assistance given to me in the preparation of this paper by Dr. Steindachner, to whom I am indebted for information as to the number of gill-rakers in the typical examples of *Cichlosoma bifasciatum*, *C. lentiginosum*, *C. altifrons*, and *C. Sieboldii*, and by Dr. Th. Gill, through whose intervention the British Museum has acquired typical specimens of *Cichlosoma centrarchus*, *C. balteatum*, *C. rostratum*, and *C. basilare*. Dr. S. Garman has very kindly given me information as to the number of gill-rakers and the length of the dorsal spines in *C. pavonaceum*.

In the descriptions of the species the number of scales in a longitudinal series is counted from above the origin of the lateral line to the base of the caudal fin, in a transverse series from the base of the first dorsal spine to the lateral line and thence to the middle of the abdomen. The number of scales in a transverse series between the lateral line and the base of the soft dorsal fin does not include the scales forming the sheath which is usually present at the base of the fin. The length of the last dorsal spine is measured from its tip to its actual base, not to the free edge of the scaly sheath at its base. The caudal peduncle is measured from the level of the base of the last anal ray to the actual base of the middle caudal rays, a point which is easily ascertained by bending the fin laterally. I have given a list of the specimens in the British Museum collection on which my descriptions are founded, with the total length in millimetres of each.

The relations of the genera here dealt with are shown in the following synopsis:—

Dorsal fin without notch between spinous and soft portions; anal fin with more than 3 spines; gill-rakers short or of moderate length, in small or moderate number.

I. Dorsal with XIII–XX 10–16 rays, anal with IV–XII 7–16.

A. Teeth all conical or cylindrical, not compressed.

Posterior (ascending) processes of præmaxillaries shorter than the head. . . . . *Cichlosoma*.

Posterior processes of præmaxillaries as long as the head. *Petenia*.

B. Teeth mostly conical, but the median teeth of the outer series compressed, pointed in the young, truncate in the adult.

*Herichthys*.

C. Teeth all rather broad and strongly compressed; scales large, those of the lateral line of the same size as the others.

Teeth entire, with pointed or rounded apices . . . . . *Paraneetroplus*.

Teeth entire, truncate, incisor-like . . . . . *Neetroplus*.

Teeth tricuspid, except the median ones of the outer series, which are entire, truncate, incisor-like . . . *Herotilapia*.

D. Teeth slender, compressed, pointed in the young, rounded in the adult; scales rather small, those of the lateral line larger than the others . . . . . *Uaru*.

II. Dorsal with VIII–XIII 24–31 rays, anal with V–IX 24–32; teeth conical.

Teeth confined to the anterior part of each jaw . . . . . *Symphysodon*.

Teeth extending on to the sides of the jaws . . . . . *Pterophyllum*.

# CICHLISOMA.

*Cichlasoma*, Swains. Nat. Hist. Fish. ii. p. 230 (1839); Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 615; Jord. & Everm. Proc. U.S. Nat. Mus. xlvii. 1898, p. 1514; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 202 (1904); Meek, Zool. Pub. Columbian Mus. v. 1904, p. 204.

*Acara* (part.), Heck. Ann. Mus. Wien, ii. 1840, p. 338; Günth. Cat. Fish. iv. p. 276 (1862); Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 63.

*Heros*, Heck. t. c. p. 362; Günth. t. c. p. 285; Jord. & Everm. t. c. p. 1526; Pellegr. t. c. p. 226.

*Hoplarchus*, Kaup, Arch. f. Nat. 1860, p. 128.

*Theraps*, Günth. t. c. p. 284.

*Mesonauta*, Günth. t. c. p. 300.

*Archocentrus*, Gill, Proc. Ac. Philad. 1877, p. 186.

*Petenia* (part.), Eigenm. & Bray, t. c. p. 614; Pellegr. t. c. p. 243.

*Astronotus* (part.), Eigenm. & Bray, t. c. p. 615.

*Astatheos*, Pellegr. t. c. p. 203.

*Thorichthys*, Meek, t. c. p. 222.

Body deep or elongate, compressed; scales large or moderate, usually ctenoid. Two lateral lines. Jaws with bands of small conical teeth, the outer series more or less enlarged and sometimes forming canines. Mouth small or moderate.

Præmaxillary processes shorter than the head; maxillary exposed or not. Upper surface of head scaly to the level of the orbits or beyond; cheeks and opercular bones scaly; præoperculum entire. Gill-rakers rather short and few (6–15 on the lower part of anterior arch). A single dorsal fin, with XIV–XIX 7–15 rays; no notch between spinous and soft portions. Anal with IV–XII 6–14 rays. Pectoral asymmetrical, with 12–18 rays; ventrals below or a little behind the base of the pectorals. Caudal rounded, truncate or emarginate.

Numerous species from Mexico, Central and South America.

I have examined the skeleton in four species, in which the number of vertebrae is as follows:—

<i>C. guttulatum</i>	. . . .	14 + 16 = 30.
<i>C. tetracanthus</i>	. . . .	13 + 15 = 28.
<i>C. octofasciatum</i>	. . . .	13 + 16 = 29.
<i>C. Salvini</i>	. . . .	13 + 15 = 28.

The ribs are subsessile. The supraoccipital crest is high and extends forwards on to the frontals, which are hollowed out anteriorly for the reception of the præmaxillary processes. In *C. guttulatum* and *C. octofasciatum* these are comparatively short and the supraoccipital crest extends forward nearly to the level of the anterior margins of the orbits. In *C. tetracanthus* and *C. Salvini* the præmaxillary processes are longer and the supraoccipital crest terminates above the middle of the orbits. The parietal crests are well developed and extend forward to above the middle of the orbits. The pelvic bones do not diverge anteriorly. In *C. tetracanthus* the lower pharyngeals are strongly developed, they are firmly united by a very sinuous suture, and bear large obtuse teeth; the fourth vertebra bears a moderately developed inferior apophysis. In the other three species the suture between the lower pharyngeals is straight, the teeth are pointed, whilst the inferior apophysis is feeble or wanting.

The genus *Cichlosoma* stands in the same relation to *Acara* that the African *Lamprologus* does to *Paratilapia*, and, as far as external characters are concerned, it is more difficult to distinguish between *Cichlosoma* and *Lamprologus* than between *Acara* and *Paratilapia*. *C. Dovii*, for example, presents considerable similarity to *L. congolensis* in general form, structure of the fins, structure of the mouth, dentition, &c. The most notable difference is that in *Lamprologus* the scales on the cheeks and opercular bones are usually

deciduous or wanting and the scales on the upper surface of the head and of the anterior part of the body and on the lower part of the abdomen are very small, which is not the case in *Cichlosoma*. A comparison of the skeletons shows that the African genus is distinguished by certain features of specialization, such as the low occipital crest, the absent parietal crests, the attachment of the ribs near the free ends of the parapophyses, and the anterior divergence of the pelvic bones.

A natural arrangement of the numerous species of this genus is a matter of considerable difficulty. I have tried to group the species according to their relationships and at the same time to so define the various sections that they may be mutually exclusive.

### *Synopsis of the Species.*

1. Teeth of the outer series in the upper jaw usually more or less distinctly and regularly increasing in size anteriorly (the anterior pair not strongly enlarged unless the lips are exceptionally thick). Teeth of the outer series in the lower jaw either similar to those of the upper jaw or with the anterior 2 to 6 on each side enlarged, subequal, and rather distinct from the smaller lateral teeth.
- A. Scales of the lateral line of the same size as those below it on the side of the body.
  1. D. XIV-XVI 9-11. A. IV (? V or VI) 8-9. Scales of thoracic region not much smaller than those on the side of the body.
    1. *bimaculatum*.
    2. *festivum*.
  2. D. XIV-XVI 10-12. A. VIII-IX 10-12. Body increasing in depth to below posterior part of dorsal fin.
  3. D. XV-XIX 7-14. A. VI-XII 6-11. 6 to 8 gill-rakers on the lower part of the anterior arch. Body ovate. Pectoral extending to above the origin of anal or beyond. Soft dorsal scaly at the base. Lips normal.
    - a. D. XV-XVII 9-11. A. VI-VIII 7-9. 1 or  $1\frac{1}{2}$  scales between lateral line and base of anterior part of soft dorsal.
      3. *facetum*.
      4. *autochthon*.
      5. *oblongum*.
- Depth of body  $1\frac{3}{4}$ - $2\frac{1}{3}$  in the length; fold of the lower lip not continuous; pectoral extending to above origin of anal .....
  6. *temporale*.
- Depth of body about 2 in the length; fold of the lower lip continuous; pectoral extending a little beyond origin of anal .....
  7. *coryphænoides*.
- Depth of body  $2\frac{2}{3}$  in the length .....
  8. *nigrofasciatum*.
- b. D. XVI-XVIII 11-14. A. VI-VIII 9-11.
  - $2\frac{1}{3}$  scales between lateral line and base of anterior part of soft dorsal .....
    6. *temporale*.
  - 4 scales between lateral line and base of anterior part of soft dorsal .....
    7. *coryphænoides*.
- c. D. XVII-XIX 7-10. A. VIII-XII 6-9.
- D. XVII-XVIII 8-9. A. VIII-X 6-8. Snout much shorter than postorbital part of head. . . . .

- D. XVIII-XIX 9-10. A. VIII-X 7-8. Snout not shorter than postorbital part of head.... 9. *spilurum*.
- D. XVIII-XIX 7-8. A. XI-XII 7-8 ..... 10. *spinosissimum*.
- D. XVIII-XIX 9-10. A. IX 9 ..... 11. *immaculatum*.
4. D. XVI 8-9. A. X-XI 8-9. 15 gill-rakers on the lower part of the anterior arch..... 12. *centrarchus*.
5. D. XV-XVIII 10-15. A. IV-VII 8-11. Scales of thoracic region considerably smaller than those on the side of the body. Either less than 11 gill-rakers on the lower part of anterior arch or the depth of body  $\frac{1}{3}$  or less than  $\frac{1}{3}$  its length. Pectoral not extending to above the anal. Soft dorsal more or less distinctly scaly at the base.
- a. Caudal truncate or rounded.
- a. Last dorsal spine  $\frac{1}{2}$ - $\frac{3}{5}$  the length of head; lower jaw shorter than the upper; depth of body  $2\frac{1}{3}$ - $2\frac{2}{3}$  in the length. D. XVII-XVIII 12-15. A. V-VI 8-10.
- Length of head  $3\frac{1}{4}$ - $3\frac{1}{2}$  in the length of the fish .. 13. *Eigenmanni*.
- Length of head  $3\frac{2}{3}$ -4 in the length of the fish .. 14. *nebuliferum*.
- $\beta$ . Last dorsal spine  $\frac{2}{3}$ - $\frac{3}{5}$  the length of head; jaws equal anteriorly.
- † Depth of body  $1\frac{3}{4}$ -2 in the length; caudal peduncle  $\frac{1}{2}$ - $\frac{3}{4}$  as long as deep.
- D. XVI-XVII 12-14. A. VI-VII 9-10. Last dorsal spine more than  $\frac{1}{2}$  the length of head. A large dark blotch on the caudal peduncle.. 15. *maculicauda*.
- D. XVII-XVIII 11-13. A. VI-VII 8-9. Last dorsal spine  $\frac{1}{2}$  the length of head. Dark cross-bars and a dark band from operculum to base of caudal ..... 16. *fenestratum*.
- †† Depth of body 2 in the length; caudal peduncle as long as deep; last dorsal spine  $\frac{1}{2}$  the length of head. D. XVII 13. A. VI 9 ..... 17. *bifasciatum*.
- ††† Depth of body  $2\frac{1}{3}$ - $2\frac{2}{3}$  in the length; caudal peduncle from  $\frac{2}{3}$  to as long as deep; last dorsal spine  $\frac{2}{3}$ - $\frac{1}{2}$  the length of head.
- \* 8 to 10 gill-rakers on the lower part of the anterior arch; anal with 6 or 7 spines. 18. *guttulatum*.
- \*\* 7 or 8 gill-rakers on the lower part of the anterior arch; anal with 4 to 6 spines.
- ‡ Fold of the lower lip continuous. 19. *microphthalmus*.
- †† Fold of the lower lip not continuous or sub-continuous.
- § Caudal peduncle  $\frac{3}{4}$  as long as deep. 20. *sexfasciatum*.
- §§ Caudal peduncle from  $\frac{3}{4}$  to as long as deep.
- 3 scales between lateral line and base of anterior part of soft dorsal; interorbital width  $2\frac{2}{3}$ -3 in the length of head; 2 dark longitudinal bands or series of spots, one above the upper lateral line, the other from the middle of side to the base of caudal ..... 21. *melanurum*.
- 3 scales between lateral line and base of anterior part of soft dorsal; interorbital width  $2\frac{1}{4}$ - $2\frac{2}{3}$

- in the length of head; dark cross-bars and a dark longitudinal band from operculum to base of caudal ..... 22. *Gadovii*.
- 2 or  $2\frac{1}{2}$  scales between lateral line and base of anterior part of soft dorsal; a broad dark band from operculum to middle of side and thence running upwards to the dorsal fin.... 23. *intermedium*.
- †††† Depth of body  $2\frac{3}{8}$ – $2\frac{5}{8}$  in the length.
- D. XVIII 13. A. VI 9–10 ..... 24. *Guentheri*.
- D. XVI 12. A. V 8 ..... 25. *pavonaceum*.
- γ. Last dorsal spine  $\frac{1}{3}$  the length of head; depth of body  $2\frac{1}{3}$ – $2\frac{3}{4}$  in the length.
- D. XVII 11. A. V 8. Depth of body  $2\frac{1}{3}$  in the length ..... 26. *Sieboldii*.
- D. XVI–XVII 12–13. A. V 10. Depth of body  $2\frac{2}{3}$ – $2\frac{3}{4}$  in the length..... 27. *Godmanni*.
- δ. Last dorsal spine  $\frac{1}{3}$ – $\frac{2}{3}$  the length of head; depth of body  $3$ – $3\frac{1}{2}$  in the length. D. XV–XVII 12–14. A. IV–V 9–10. .... 28. *irregulare*.
- b. Caudal emarginate, with rounded lobes. .... 29. *lentiginosum*.
6. D. XVIII–XIX 10–11. A. VII–VIII 7–9. 9 or 10 gill-rakers on the lower part of the anterior arch. Pectoral extending to above the origin of anal or beyond.
- Interorbital width 3 in the length of head; pectoral extending to above the origin of anal. . 30. *balteatum*.
- Interorbital width  $2\frac{1}{3}$ – $2\frac{2}{3}$  in the length of head; pectoral extending a little beyond the origin of anal ..... 31. *nicaraguense*.
7. D. XIV–XVII 10–14. A. V–VII 8–10. 9 to 13 gill-rakers on the lower part of the anterior arch. Depth of body  $\frac{2}{3}$  its length or more. Pectoral extending beyond origin of anal or 11 to 13 gill-rakers on the lower part of the anterior arch. Soft dorsal more or less distinctly scaly at the base. Lips normal.
- a. Fourth to sixth dorsal spines longer than the rest. D. XVI 10–11. A. VI 8–9.
- Pectoral extending to above the middle of anal . . 32. *Robertsoni*.
- Pectoral extending to the posterior end of anal . . 33. *longimanus*.
- b. Dorsal spines either subequal from the fifth or sixth or increasing in length throughout.
- a. D. XIV–XV 12–15. A. V 8–9. Snout shorter than post-orbital part of head.
- Pectoral extending beyond the origin of anal .... 34. *macracanthus*.
- Pectoral not extending beyond the origin of anal. 35. *heterodontus*.
- β. D. XVI 11. A. V 8–9. Snout longer than postorbital part of head; pectoral extending nearly to the origin of anal ..... 36. *altifrons*.
- γ. D. XVI–XVII 11–12. A. VII 8–9.
- † Pectoral extending to above the last anal spine. .... 37. *rostratum*.

†† Pectoral extending to above the third or fourth anal spine.

Caudal slightly emarginate, with rounded lobes.. 38. *margaritifерum*.  
Caudal rounded ..... 39. *citrinellum*.

8. D. XVII 11-12. A. VII-VIII 8-9. Pectoral extending beyond the origin of anal. Lips exceptionally thick.

a. Lips subnormal ..... 40. *erythræum*.  
b. Each lip produced as a long fleshy triangular flap.

Depth of body  $2\frac{1}{4}$  in the length, length of head nearly 3 ..... 41. *lobochilus*.

Depth of body  $2\frac{1}{3}$  in the length, length of head  $2\frac{1}{3}$ - $2\frac{2}{3}$ ..... 42. *labiatum*.

9. D. XV-XVII 8-12. A. VI-IX 6-9. Dorsal fin entirely scaleless. Caudal slightly emarginate, with pointed lobes.

a. Last dorsal spine  $\frac{1}{2}$  the length of head; pectoral extending beyond origin of anal.

Snout not longer than postorbital part of head .. 43. *aureum*.

Snout longer than postorbital part of head ..... 44. *affine*.

b. Last dorsal spine  $\frac{2}{3}$  the length of head or less; pectoral extending to above origin of anal .... 45. *callolepis*.

10. D. XV-XVII 13-14. A. VII-VIII 12-14. Body ovate.

46. *severum*.

B. Scales of the lateral line larger than those below it on the side of the body ..... 47. *psittacum*.

II. Teeth of the outer series in the upper jaw increasing in size anteriorly, with the anterior pair more or less distinctly differentiated as canines. Anterior pair of teeth in the lower jaw, if present, smaller than the next 1 or 2 pairs, which are more or less strongly enlarged and canine-like. Lips normal. Scales of thoracic region small.

A. D. XV-XVI 10-12. A. IV 8-10.

Caudal peduncle nearly as long as deep ..... 48. *adpersum*.

Caudal peduncle  $\frac{2}{3}$ - $\frac{3}{4}$  as long as deep ..... 49. *tetracanthus*.

B. D. XV-XVI 10-13. A. V (IV-VI) 7-10.

1. Snout nearly equal to postorbital part of head (in the adult); caudal peduncle as long as deep.

Depth of body  $2\frac{3}{5}$ - $2\frac{2}{3}$  in the length; jaws equal anteriorly ..... 50. *istlanum*.

Depth of body  $2\frac{1}{5}$ - $2\frac{2}{5}$  in the length; lower jaw projecting..... 51. *Bartoni*.

2. Snout shorter than postorbital part of head (in the adult); lower jaw projecting.

Depth of body  $2$ - $2\frac{1}{3}$  in the length; caudal peduncle  $\frac{2}{3}$  as long as deep..... 52. *Beani*.

Depth of body  $2\frac{1}{2}$ - $2\frac{4}{5}$  in the length; caudal peduncle as long as deep ..... 53. *mento*.

3. Snout longer than postorbital part of head (in the adult); depth of body  $2\frac{1}{3}$ -3 in the length.

Lower jaw slightly projecting (in the adult); caudal peduncle deeper than long ..... 54. *Festæ*.

Lower jaw a little shorter than the upper (in the adult); caudal peduncle as long as deep .... 55. *ornatum*.

- C. D. XVII-XIX 8-10. A. VIII-X 7-8. Præmaxillary processes extending to above the anterior margin of eye.

56. *octofasciatum*.

- D. D. XV-XVIII 9-12. A. VI-IX 7-10.

1. Præmaxillary processes extending to above anterior  $\frac{1}{3}$  of eye. D. XV-XVII 10-12. A. VI 8-9.... 57. *urophthalmus*.

2. Præmaxillary processes extending to above middle of eye or beyond.

a. Last dorsal spine  $\frac{1}{2}$  or nearly  $\frac{1}{2}$  the length of head; maxillary extending to below anterior margin of eye; D. XVI-XVII 9-12.

Snout shorter than postorbital part of head (in the adult). A. VI-VIII 8-9 .....

58. *trimaculatum*.

Snout as long as postorbital part of head (in the adult). A. VIII-IX 7-9 .....

59. *Salvini*.

b. Last dorsal spine about  $\frac{2}{5}$  the length of head; maxillary extending to below anterior  $\frac{1}{4}$  of eye; D. XVIII 10. A. VII-VIII 8-9; depth of body  $2\frac{1}{4}$ - $2\frac{1}{3}$  in the length; caudal peduncle  $\frac{1}{2}$ - $\frac{3}{4}$  as long as deep..... 60. *multifasciatum*.

c. Last dorsal spine about  $\frac{1}{3}$  the length of head.

a. Maxillary extending to below anterior margin or anterior  $\frac{1}{4}$  of eye; D. XVII-XVIII 9-11. A. VII-VIII 8-9; depth of body  $2\frac{2}{5}$ - $2\frac{3}{5}$  in the length.

Caudal peduncle  $\frac{2}{3}$  as long as deep; depth of præorbital  $\frac{2}{3}$ - $\frac{3}{5}$  the diameter of eye (in specimens of 120-130 mm. in total length) .....

61. *Friedrichstahli*.

Caudal peduncle  $\frac{2}{3}$ - $\frac{4}{5}$  as long as deep; depth of præorbital  $\frac{2}{3}$  the diameter of eye (in a specimen of 115 mm.) or equal to it (in the adult fish) .....

62. *motaguense*.

$\beta$ . Maxillary extending to below middle of eye. D. XVIII 10. A. VII 8 .....

63. *managuense*.

$\gamma$ . Maxillary extending to below anterior  $\frac{1}{3}$  of eye. D. XVIII 12. A. VI 9-10 ....

64. *Dorri*.

d. Last dorsal spine  $\frac{1}{2}$  or nearly  $\frac{1}{2}$  the length of head; maxillary extending to below the middle of eye.

D. XV 12-13. A. VI 9-10; scales above lateral line of the same size as those below it .....

65. *spectabile*.

D. XV-XVI 10-11. A. VI 8-9; scales above lateral line smaller than those below it ....

66. *Kraussi*.

### Subgenus CICHLOSOMA.

In the more generalized forms the teeth of the outer series in both jaws rather small, scarcely increasing in size anteriorly. In more specialized forms the teeth of the outer series stronger, regularly and distinctly increasing in size anteriorly. Sometimes the anterior 3 to 6 teeth on each side in the lower jaw enlarged, subequal and rather sharply differentiated from the smaller lateral teeth. In 3 very specialized species (with exceptionally thick lips) the anterior pair of teeth in the upper jaw very strong, the anterior 2 pairs in the lower jaw strongly enlarged, subequal.



Section 1 (*Cichlosoma*).

Body ovate; scales of lateral line of the same size as those above and below it; scales of thoracic region scarcely smaller than those on the side of the body. Mouth rather small, moderately protractile; maxillary not exposed; teeth of the outer series rather small, scarcely increasing in size anteriorly. Dorsal XIV-XVI 9-11, the soft fin scaly at the base. Anal IV (? V or VI) 8-9. Caudal rounded.

The single species, from South America, is undoubtedly closely allied to *Acara portalegrensis*. On the other hand, it shows clear affinities with *Cichlosoma facetum* and its allies.

1. *Cichlosoma bimaculatum*.

*Sciæna bimaculata*, Linn. Mus. Ad. Fried. i. p. 66 (1754).

*Labrus bimaculatus*, Linn. Syst. Nat. (ed. x.) p. 285 (1758).

*Labrus punctatus* (part.), Linn. l. c.

*Labrus punctatus*, Bloch, Ausl. Fische, vi. p. 20, pl. cexcv. (1792);

Schneider, Bloch's Syst. Ichth. p. 251 (1801).

*Perca bimaculata*, Bloch, t. c. p. 82, pl. cccx.

*Cichla bimaculata*, Schneider, o. c. p. 338.

*Chromis tania*, Bennett, Proc. Zool. Soc. i. 1830, p. 112; Storer, Mem. Ac. Amer. ii. 1846, p. 520.

*Acara margarita*, Heck. Ann. Mus. Wien, ii. 1840, p. 338.

*Acara marginata*, Heck. t. c. p. 350.

*Acara punctata*, Heck. t. c. p. 360.

*Acara Gronovii*, Heck. t. c. p. 361.

*Cychlasoma tania*, Gill, Ann. Lyc. N. York, vi. 1858, p. 383.

*Heros bimaculatus*, Cope, Proc. Ac. Philad. xxiii. 1872, p. 254.

*Acara (Heros) bimaculata*, Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 82.

*Astronotus (Cichlasoma) bimaculatus*, Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 618.

*Cichlasoma bimaculatum*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 204 (1904).

Depth of body  $1\frac{3}{4}$ - $2\frac{1}{5}$  in the length, length of head  $2\frac{2}{3}$ -3. Eye much nearer to tip of snout than to extremity of operculum, its diameter  $2\frac{2}{3}$ -4 in the length of head, interorbital width 2- $2\frac{3}{4}$ . Depth of præorbital equal to the diameter of eye or less. Maxillary extending to the vertical from anterior margin of eye; præmaxillary processes extending nearly to above anterior margin of eye; jaws equal anteriorly; fold of the lower lip not continuous; cheek with 3 series of scales; 6 or 7 gill-rakers on the lower part of anterior arch. Scales 25-27  $\frac{3-4}{9-10}$ , 2 between lateral line and base of anterior part of soft dorsal. Dorsal XIV-XVI 9-11, commencing above the opercular cleft, the spines slightly increasing in length to the last, which is  $\frac{2}{5}$  the length of head. Anal IV (V-VI) 8-9. Pectoral as long as the head, extending to

above the anal spines; ventral often extending to posterior end of anal. Caudal rounded. Caudal peduncle about  $\frac{2}{3}$  as long as deep. Brownish, with 8 dark cross-bars, the third bearing a blotch below the lateral line; a dark spot below the posterior part of eye and another on the upper part of the base of caudal; a longitudinal band from eye to lateral blotch; each scale of the lower half of the body with a light spot at its base; each scale of the posterior half of the body with a dark spot; soft dorsal, anal and caudal spotted.

Brazil; Guiana; Trinidad.

1-2. (72 and 83 mm.)	Demerara.	Dr. Hancock.
3-5. (83-121 mm.)	British Guiana.	Sir R. Schomburgk.
6-14. (73-141 mm.)	Guiana.	Berlin Museum.
15. (150 mm.)	Trinidad.	Zoological Society.
16-17. (93 and 107 mm.)	Bahia.	Dr. Wucherer.
18-21. (41-56 mm.)	Demerara.	F. G. Beckford, Esq.
22-36. (40-92 mm.)		
37-39. (70-112 mm.)	Berbice.	F. G. Beckford, Esq.
40-42. (50-105 mm.)	Demerara.	
43-46. (144-156 mm.)	British Guiana.	
47. (180 mm.)	Trinidad.	F. W. Urich, Esq.
48-52. (134-171 mm.)	Trinidad.	L. Guppy, Esq.
53-54. (72 and 88 mm.)	Tabatinga.	Mus. Comp. Zool.

All agree in having 4 anal spines, and the numbers 5 and 6 are evidently quite exceptional.

## Section 2 (*Mesonauta*).

Body increasing in depth to below the posterior part of the dorsal fin; scales of lateral line of the same size as those above and below it; scales of thoracic region not very much smaller than those on the side of the body. Mouth small, moderately protractile; maxillary very slightly exposed distally; teeth of the outer series distinctly increasing in size anteriorly. Dorsal XIV-XVI 10-12, the soft fin scaly at the base. Anal VIII-IX 10-12. Caudal rounded.

The single species, from South America, shows relationships with *C. bimaculatum* and *C. autochthon*.

## 2. *Cichlosoma festivum*.

*Heros festivus*, Heck. Ann. Mus. Wien, ii. 1840, p. 376.

*Heros insignis*, Heck. t. c. p. 378.

*Chromys acora*, Casteln. Anim. Am. Sud, Poiss. p. 17, pl. ix. fig. 1 (1855).

*Mesonauta insignis*, Günth. Cat. Fish. iv. p. 300 (1862).

*Acara (Heros) festiva*, Steind. Sitzb. Ak. Wien, lxxx. 1875, p. 93.

*Mesonauta festivus*, Eigenm. & Bray, Ann. Ac. N. York, vii. 1894, p. 619.

*Cichlasoma insigne*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 221 (1904).

Depth of body  $1\frac{3}{4}$ –2 in the length, length of head  $2\frac{3}{5}$ –3. Snout longer than postorbital part of head. Diameter of eye  $2\frac{2}{3}$ – $3\frac{1}{2}$  in the length of head, interorbital width  $2\frac{1}{4}$ – $2\frac{1}{3}$ . Depth of præorbital equal to diameter of eye (adult) or less (young). Maxillary extending to a little beyond the nostril; præmaxillary processes not extending to above the eye; jaws equal anteriorly; fold of the lower lip not continuous; cheek with 3 series of scales; 5 or 6 gill-rakers on the lower part of anterior arch. Scales 27–29  $\frac{3\frac{1}{2}-4}{11-12}$ ,  $3\frac{1}{2}$ –4 between lateral line and anterior rays of soft dorsal. Dorsal XIV–XVI 10–12, commencing above or behind axil of pectoral, the spines increasing in length to the last, which is  $\frac{3}{5}$ – $\frac{3}{4}$  the length of head, the soft fin pointed, much produced in the adult. Anal VIII–IX 10–12. Pectoral  $\frac{3}{4}$ – $\frac{4}{5}$  the length of head, extending to above the fifth anal spine; ventral, in the adult, extending to the caudal. Caudal rounded. Caudal peduncle  $\frac{1}{4}$  as long as deep. Brownish, with an oblique blackish stripe from the snout, through the eye, to the tip of soft dorsal; a dark ocellated spot on the upper  $\frac{1}{2}$  of base of caudal; dorsal and caudal fins spotted.

Guiana; R. Amazon; R. de la Plata.

1. (90 mm.)	?	Zoological Society.
2. (102 mm.)	Demerara.	F. G. Beckford, Esq.
3. (147 mm.)	Rio Negro.	Mr. J. C. Antony.
4. (72 mm.)	Descalvados, Matto Grosso.	Dr. Ternetz.
5–7. (45–56 mm.)	Carandasiñho, Matto Grosso.	Dr. A. Borelli.
8. (106 mm.)	Tocantins, Brazil.	Paris Museum.

### Section 3.

Body ovate; scales of lateral line of the same size as those above and below it; scales of thoracic region not very much smaller than those on the sides of the body. Mouth rather small, moderately protractile; maxillary very slightly exposed distally; teeth of the outer series moderate, distinctly enlarged anteriorly. Dorsal XV–XVII 9–11, the soft fin scaly at the base. Anal VI–VIII 7–9. Pectoral extending to above the origin of anal or a little beyond. Caudal rounded.

The three species, from South America, show relationship to *C. bimaculatum* in their general form and in the comparatively large size of the scales of the thoracic region.

### 3. *Cichlosoma facetum*.

*Chromis facetus*, Jenyns, Voy. 'Beagle,' Fishes, p. 104 (1842).

*Heros facetus*, Günth. Cat. Fish. iv. p. 290 (1862); Steind. Sitzb. Ak. Wien, lx. 1869, p. 290, pl. i.

*Heros Jemysii*, Steind. t. c. p. 292, pl. ii.

*Heros acaroides*, Hensel, Arch. f. Nat. xxxvi. 1870, p. 54.

*Acara faceta*, Steind. Sitzb. Ak. Wien, lxx. 1874, p. 506.

*Cichlasoma facetum*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 217 (1904).

Depth of body  $1\frac{3}{4}$ – $2\frac{1}{5}$  in the length, length of head  $2\frac{5}{7}$ –3. Eye nearer to tip of snout than to the extremity of operculum, its diameter  $3$ – $4\frac{1}{2}$  in the length of head, interorbital width  $2\frac{2}{5}$ – $2\frac{4}{5}$ . Depth of præorbital equal to diameter of eye (adult), or a little more than  $\frac{1}{2}$  diameter of eye (young). Maxillary not or scarcely reaching the vertical from anterior margin of eye; præmaxillary processes extending to above anterior margin of eye; jaws equal anteriorly; fold of the lower lip not continuous; cheek with 4–5 series of scales, the lower 1 or 2 rows often deciduous in the adult; 7 or 8 gill-rakers on the lower part of the anterior arch. Scales 26–28  $\frac{3\frac{1}{2}-4\frac{1}{2}}{10-11}$ ,  $1\frac{1}{2}$  between lateral line and base of anterior rays of soft dorsal. Dorsal XV–XVII 9–11, commencing above the opercular cleft, the spines increasing in length to the last, which is nearly half the length of head, the soft fin pointed, when laid back extending to or beyond the middle of caudal. Anal VI–VIII 7–9. Pectoral  $\frac{3}{4}$ – $\frac{4}{5}$  the length of head, extending to above the origin of anal; ventral extending to origin of anal or beyond. Caudal rounded. Caudal peduncle  $\frac{2}{5}$ – $\frac{1}{2}$  as long as deep. Olivaceous, with 6 or 7 dark cross-bars; a dark spot at the base of caudal; fins dusky.

Rio de la Plata; Rio Grande do Sul.

1. (158 mm.)	Buenos Ayres.	Mr. White.
2–8, 9–11, 12–14. (50–122 mm.)	Rio Grande do Sul.	Dr. H. von Ihering.
15–16. (132 & 152 mm.)	Rio Parana.	Mr. Salmin.

#### 4. *Cichlosoma autochthon*.

*Heros autochthon*, Günth. Cat. Fish. iv. p. 299 (1862); Kner, Novara Fische, p. 265 (1869); Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 235 (1904).

*Acara* (*Heros*) *autochthon*, Steind. Sitzb. Ak. Wien, lxx. 1874, p. 502, pl. i.

Depth of body about 2 in the length, length of head about  $2\frac{4}{5}$ . Eye much nearer to tip of snout than to extremity of operculum, its diameter  $3$ – $3\frac{1}{2}$  in the length of head, interorbital width about  $2\frac{1}{3}$ . Depth of præorbital  $\frac{3}{5}$ – $\frac{3}{4}$  diameter of eye. Maxillary not or scarcely extending to the vertical from anterior margin of eye; præmaxillary processes extending to above anterior  $\frac{1}{4}$  of eye; lower jaw usually slightly projecting; fold of the lower lip continuous; cheek

with 3 series of scales; 7 or 8 gill-rakers on the lower part of anterior arch. Scales 26-28  $\frac{2-4}{9-10}$ , 1 between lateral line and base of anterior part of soft dorsal. Dorsal XV-XVI (XVII) 9-10, commencing above the opercular cleft, the spines increasing in length to the last, which is  $\frac{1}{2}$  the length of head or more; the soft fin pointed, when laid back extending to the extremity of caudal. Anal VI-VII (VIII) 7-8. Pectoral as long as the head, extending to above the third or fourth anal spine; ventral extending beyond origin of anal, sometimes nearly to the caudal. Caudal rounded. Caudal peduncle  $\frac{1}{3}$ - $\frac{2}{5}$  as long as deep. Olivaceous, with 6 or 7 dark cross-bars; a dark spot at the base of the caudal; fins dusky.

Eastern Brazil.

1-3. (123-128 mm.)	Brazil.	Lord Stuart.
4. (113 mm.)		
5-6. (82 and 123 mm.)	Theresopolis.	Dr. E. A. Göldi.
7. (89 mm.)	Porto Real, Prov. Rio Janeiro.	M. Hardy du Dréneuf.

### 5. *Cichlosoma oblongum*.

*Chromys oblonga*, Casteln. Anim. Am. Sud, Poiss. p. 14 (1855).

*Iheros oblongus*, Günth. Cat. Fish. iv. p. 299 (1862); Pellegr Mém. Soc. Zool. France, xvi. 1903, p. 236 (1904).

Depth of body  $2\frac{2}{5}$  in the length, length of head  $2\frac{2}{3}$ . Snout as long as eye, the diameter of which is  $3\frac{1}{2}$  in the length of head, interorbital width  $3\frac{1}{4}$ . Depth of præorbital  $\frac{2}{3}$  the diameter of eye. Maxillary extending nearly to below the eye; præmaxillary processes extending to above anterior  $\frac{1}{3}$  of eye; jaws equal anteriorly; fold of the lower lip subcontinuous; cheek with  $1\frac{1}{2}$  series of scales, its lower part naked; 6 gill-rakers on the lower part of anterior arch. Scales 26  $\frac{3\frac{1}{2}}{11}$ ,  $1\frac{1}{2}$  between lateral line and base of anterior rays of soft dorsal. Dorsal (XV) XVI 10, commencing above the opercular cleft, the spines subequal from the fourth to the twelfth, thence increasing to the last, which is  $\frac{1}{2}$  the length of head; soft fin, when laid back, extending nearly to middle of caudal. Anal VI 9 (VII 7). Pectoral nearly as long as the head, extending to above the fourth anal spine; ventral extending a little beyond origin of anal. Caudal slightly rounded. Caudal peduncle  $\frac{1}{2}$  as long as deep. Brownish, with about 7 dark cross-bars; fins blackish.

Southern and Eastern Brazil; Argentina.

1. (101 mm.)	Argentina.	Captain Vipan.
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According to Pellegrin, the type of *Chromys oblonga*, from

Tocantins, is in bad condition, but the species is closely allied to *C. autochthon*. As the specimen described above agrees well enough with his description of *H. oblongus*, I provisionally refer it to that species.

#### Section 4.

Body ovate; scales of lateral line of the same size as those above and below it; scales of thoracic region considerably smaller than those on the sides of the body. Mouth moderate or rather large (maxillary extending to or nearly to below the eye, snout longer than postorbital part of head), moderately protractile; maxillary very slightly exposed distally; teeth of the outer series moderate, well developed laterally, distinctly increasing in size anteriorly. Dorsal XVI-XVIII 11-14, the soft fin scaly at the base. Anal VI-VIII 9-11. Pectoral extending to above the origin of anal. Caudal rounded.

The two species, from South America, are modified from the type represented by *C. facetum*.

#### 6. *Cichlosoma temporale*.

*Heros temporalis*, Günth. Cat. Fish. iv. p. 287 (1862).

*Acara (Heros) crassa*, Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 88, pl. v.

*Heros Goeldii*, Bouleng. Ann. & Mag. Nat. Hist. xx. 1897, p. 298;

Goeldi, Boll. Mus. Para, ii. 1898, pl.

*Cichlasoma temporale*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 218 (1904).

Depth of body about  $1\frac{5}{8}$  ( $1\frac{3}{4}$ -2) in the length, length of head  $2\frac{2}{3}$ -3. Snout longer than postorbital part of head. Diameter of eye  $3\frac{1}{3}$ - $3\frac{1}{2}$  in the length of head, interorbital width  $2\frac{1}{5}$ - $2\frac{1}{3}$ . Depth of præorbital equal to diameter of eye. Maxillary nearly extending to the vertical from anterior margin of eye; præmaxillary processes not extending to above the eye; jaws equal anteriorly; fold of the lower lip not continuous; cheek with 4 or 5 series of scales; 7 or 8 gill-rakers on the lower part of anterior arch. Scales 30-32  $\frac{4-4\frac{1}{2}}{10-11}$ ,  $2\frac{1}{2}$  between lateral line and base of anterior part of soft dorsal. Dorsal XVI-XVII 11-12, commencing above the opercular cleft, the spines slightly increasing in length to the last, which is nearly  $\frac{1}{2}$  the length of head; the soft fin pointed, when laid back extending beyond the middle of caudal. Anal VI-VII (VIII) 9 (10). Pectoral  $\frac{4}{5}$  the length of head, extending to above the origin of anal. Ventral extending to middle of anal or beyond. Caudal rounded. Caudal peduncle  $\frac{1}{2}$  as long as deep. Brownish, with 3

blackish spots or blotches, one behind the eye, the second on the middle of the side, and the third on the upper half of the base of caudal; a blackish stripe connecting the spots. Fins dusky.

Brazil; Guiana.

1. (161 mm.) type of the species. Zoological Society.
2. (159 mm.) type of *H. Goeldii*. Rio Counani, French Dr. E. A. Göldi.  
Guiana.

### 7. *Cichlosoma coryphænoides*.

*Heros coryphænoides*, Heck. Ann. Mus. Wien, ii. 1840, p. 373; Günth. Cat. Fish. iv. p. 296 (1862).

*Heros niger*, Heck. t. c. p. 375.

*Acara (Heros) coryphænoides*, Steind. Sitzb. Ak. Wien, lxxi. 1875, p. 84.

*Cichlasoma coryphænoides*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 219 (1904).

Depth of body 2 in the length, length of head  $2\frac{5}{6}$ . Snout longer than postorbital part of head. Diameter of eye  $3\frac{2}{3}$ – $3\frac{3}{4}$  in the length of head, interorbital width  $2\frac{3}{5}$ – $2\frac{2}{3}$ . Depth of præorbital  $\frac{2}{3}$ – $\frac{3}{4}$  the diameter of eye. Maxillary extending to the vertical from anterior margin of eye; præmaxillary processes not extending to above the eye; jaws equal anteriorly; fold of the lower lip slightly interrupted; cheek with 5 series of scales; 7 or 8 gill-rakers on the lower part of anterior arch. Scales 31–33  $\frac{6}{13}$ , 4 between lateral line and base of anterior rays of soft dorsal. Dorsal XVI 12–13 (14), commencing above the opercular cleft, the spines subequal from the sixth to the thirteenth, thence increasing to the last, which is more than  $\frac{1}{2}$  the length of head; soft fin, when laid back, extending beyond middle of caudal. Anal VI (VII) 9–10 (11). Pectoral  $\frac{5}{6}$  the length of head, extending to above origin of anal; ventral extending to middle of anal. Caudal rounded. Caudal peduncle  $\frac{1}{2}$  as long as deep. Brownish, with obscure darker cross-bars; a blackish blotch or vertical bar above the lateral line and below the eleventh to thirteenth dorsal spines; fins blackish.

Rio Negro.

1–2. (121 and 127 mm.)

Rio Negro.

Mr. J. C. Antony.

### Section 5 (*Archocentrus*).

Body ovate; scales of lateral line of the same size as those above and below it; scales of thoracic region considerably smaller than those on the side of the body. Mouth rather small, moderately protractile; maxillary not or slightly

exposed ; teeth of the outer series distinctly enlarged anteriorly. Dorsal XVII-XIX 7-10, the soft fin scaly at the base. Anal VIII-XII 6-9. Pectoral extending beyond the origin of anal. Caudal rounded or subtruncate.

The five species, from Guatemala and Nicaragua, are probably derived from the type represented by *C. facetum*.

### 8. *Cichlosoma nigrofasciatum*.

*Heros nigrofasciatus*, Günth. Trans. Zool. Soc. vi. 1869, p. 452, pl. lxxiv. fig. 3.

*Cichlasoma nigrofasciatum*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1525 ; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 223 (1904).

Depth of body  $2-2\frac{1}{4}$  in the length, length of head  $2\frac{3}{4}-3$ . Snout considerably shorter than postorbital part of head. Diameter of eye  $2\frac{3}{4}-3\frac{1}{2}$  in the length of head, interorbital width  $2\frac{2}{3}-3\frac{1}{4}$ . Depth of præorbital  $\frac{1}{2}-\frac{4}{5}$  the diameter of eye. Maxillary extending to the vertical from anterior margin of eye ; præmaxillary processes extending to just above anterior margin of eye ; jaws equal anteriorly ; fold of the lower lip not continuous ; cheek with 4 or 5 series of scales ; 7 or 8 gill-rakers on the lower part of anterior arch. Scales  $28-31 \frac{4}{11-12}$ , 2 or  $2\frac{1}{2}$  between lateral line and base of anterior part of soft dorsal. Dorsal XVII-XVIII 8-9, commencing above the opercular cleft, the spines subequal from the sixth to the fourteenth, thence increasing to the last, which is  $\frac{2}{3}$  the length of head ; soft fin, when laid back, extending to the middle of caudal. Anal VIII-X 6-8. Pectoral a little shorter than the head, extending to above the third or fourth anal spine ; ventral extending beyond origin of anal. Caudal rounded. Caudal peduncle  $\frac{1}{2}-\frac{2}{3}$  as long as deep. Brownish, the body with 7 or 8 black cross-bars which extend on to the dorsal fin ; a dark bar at the base of caudal.

Guatemala.

1-15. (43-82 mm.) types of the Lake Amatitlan. O. Salvin, Esq. species.

### 9. *Cichlosoma spilurum*.

*Heros spilurus*, Günth. Cat. Fish. iv. p. 289 (1862), and Trans. Zool. Soc. vi. 1869, p. 451, pl. lxxiii. fig. 1.

*Cichlasoma spilurum*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1520 ; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 222 (1904).

Depth of body 2 in the length, length of head 3. Snout as long as or longer than postorbital part of head. Diameter



of eye 3 in the length of head, interorbital width  $2\frac{2}{3}$ -3. Depth of præorbital equal to the diameter of eye or less. Maxillary not extending to below the eye; præmaxillary processes just extending to above anterior margin of eye; jaws equal anteriorly; fold of the lower lip not continuous; cheek with 4 or 5 series of scales; 6 or 7 gill-rakers on the lower part of anterior arch. Scales 28-30  $\frac{5\frac{1}{2}}{12-13}$ , 2 or  $2\frac{1}{2}$  between lateral line and base of anterior part of soft dorsal. Dorsal XVIII-XIX 9-10, commencing above the opercular cleft, the spines subequal from the sixth to the sixteenth, thence increasing to the last, which is  $\frac{1}{2}$ - $\frac{3}{5}$  the length of head; soft fin, when laid back, extending to middle of caudal. Anal VIII-IX (X 7) 8. Pectoral as long as or longer than the head, extending to above the third to fifth anal spines; ventral extending to middle of anal. Caudal rounded or subtruncate. Caudal peduncle  $\frac{1}{2}$ - $\frac{2}{3}$  as long as deep. Body with 7 dark cross-bars; a dark spot or vertical bar on the base of caudal; vertical fins dusky, sometimes spotted.

Guatemala.

1-4. (75-90 mm.) types of the species.	Lake Yzabal.	O. Salvin, Esq.
5. (92 mm.)	Rio Motagua.	O. Salvin, Esq.

#### 10. *Cichlosoma spinosissimum*.

*Heros (Cichlasoma) spinosissimus*, Vaill. & Pellegr. Bull. Mus. Paris, 1902, p. 87.

*Cichlasoma spinosissimum* (part.), Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 224 (1904).

Depth of body  $1\frac{3}{4}$  in the length, length of head 3. Diameter of eye  $3\frac{1}{2}$  in the length of head. Maxillary not extending to below the eye; fold of the lower lip not continuous; cheek with 5 series of scales; 6 gill-rakers on the lower part of anterior arch. Scales 28  $\frac{5}{14-15}$ . Dorsal XVIII-XIX 7-8, the spines subequal from the fourth, the eighth  $\frac{1}{3}$  the length of head. Anal XI-XII 7-8. Pectoral  $\frac{4}{5}$  the length of head. Caudal rounded. Caudal peduncle  $\frac{1}{2}$  as long as deep. Olivaceous, with small dark spots on the body and soft vertical fins; a dark longitudinal band from the eye to the middle of the side; posterior part of body with 4 or 5 dark cross-bars; a dark spot on the base of caudal.

Rio Polochic, Guatemala.

The types (four specimens) measure from 78-100 mm.

Very similar to *Herotilapia multispinosa*, but especially distinguished by the absolutely conical teeth.

### 11. *Cichlosoma immaculatum*.

*Cichlasoma spinosissimum*, var. *immaculatum*, Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 225 (1904).

Very similar to the preceding species. Dorsal XVIII-XIX 9-10. Anal IX 9. Scales  $29 \frac{5}{13-14}$ . Cheek with 5 or 6 series of scales. 8 gill-rakers on the lower part of anterior arch. Uniformly greyish.

Rio Polochic.

Since two specimens agree in these characters, it seems to me best to regard them as belonging to a distinct species.

### 12. *Cichlosoma centrarchus*.

*Heros centrarchus*, Gill & Bransford, Proc. Ac. Philad. 1877, p. 185.

*Cichlasoma centrarchus*, Jord. & Everm. Bull. U.S. Nat. Mus. xlvii. 1898, p. 1526; Pellegr. Mém. Soc. Zool. France, xvi. 1903, p. 224 (1904).

Depth of body nearly 2 in the length, length of head 3. Snout  $\frac{2}{3}$  as long as postorbital part of head. Diameter of eye  $3\frac{2}{3}$  in the length of head, interorbital width  $2\frac{1}{2}$ . Depth of præorbital  $\frac{3}{5}$  the diameter of eye. Maxillary not extending to below the eye; præmaxillary processes extending to above the anterior margin of eye; jaws equal anteriorly; fold of the lower lip continuous (? or not); cheek with 4 or 5 series of scales; 15 gill-rakers on the lower part of the anterior arch. Scales  $29 \frac{5}{12}$ , 2 between lateral line and base of anterior rays of soft dorsal. Dorsal XVI (8) 9, commencing above the opercular cleft, the spines subequal from the fifth to the fourteenth, the last more than  $\frac{1}{2}$  the length of head. Anal XI 8 (X 9). Pectoral as long as the head, extending to above the fifth anal spine; ventral extending to middle of anal. Caudal subtruncate. Caudal peduncle  $\frac{1}{2}$  as long as deep. Olivaceous, with 7 or 8 dark brown cross-bars; a dark spot at the base of caudal; fins dusky.

Lake of Nicaragua.

- |  |               |                   |
|--|---------------|-------------------|
| 1. (140 mm.) one of the types<br>of the species. | L. Nicaragua. | Smithsonian Inst. |
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[To be continued.]